REMARKS

This is in response to the Office Action dated September 15, 2004. Claims 5-6 are pending.

Housekeeping Matters

Initially, it is noted that the Examiner has forgotten to initial JP 9-17890 listed on the PTO 1449 accompanying the September 15, 2004 Office Action. It is respectfully requested that the Examiner provide the undersigned with another PTO-1449 where this reference has been initialed.

Also, it is respectfully requested that the Examiner formally acknowledge applicants' foreign priority claim, and the fact that the certified copy of the priority document was filed in the parent application.

General

For purposes of example only, and without limitation, certain example embodiments of this invention relate to a semiconductor memory device including at least one memory cell. Figs. 3-5 illustrate an example memory cell including a tunnel oxide film 2 (i.e., an insulator including at least some oxygen), a floating gate 3, a first insulating film 7 (e.g., ONO, or any other suitable insulator), a control gate 8, and an overlying second insulating film (10 and/or 11). A relevant aspect of certain example embodiments of this invention is shown in Figs. 5A-5D, and relates to the second insulating film (10 and/or 11) comprising an oxide formed over the tunnel oxide film 2. In particular, after the source/drain regions 4, 5 have been formed, isotropic etching may be used to remove part of the tunnel oxide film 2 under a sidewall of the floating gate 3 (e.g., pg. 17, lines 6-18; and pg. 21, lines 11-16). Due to this removal of the damaged part of the tunnel oxide film 2, there is less of a path for electrons to leak from the floating gate 3 to

the substrate 1 during operation of the finished product (e.g., pg. 21, lines 17-19). Thus, the side walls of the tunnel oxide film 2 are at least partially receded (laterally offset inwardly) from the side walls of the floating gate 3. After part of the tunnel oxide film 2 has been removed as shown in Fig. 5B, a second insulating film (10 and/or 11) comprising silicon oxide is formed over and contacting the sidewalls of the tunnel oxide film 2, the side walls of the floating gate 3, the side walls of the first insulating film 7, and the sidewalls of the control gate 8. This is advantageous for example in that substantially uniform oxidation occurs at the interface between the floating gate 3 and the surrounding insulating films; and thus substantially equal FN (Fowler-Nordheim) currents flow through the tunnel oxide film 2 during write operations (e.g., pg. 21, line 19 to pg. 22, line 2). As a result, variation in threshold voltage can be reduced, write time can be shortened, and/or cells affected by gate disturbance can be reduced (e.g., pg. 22, lines 2-11).

Art Rejection Over Thurgate

Claims 5-6 stand rejected under 35 U.S.C. Section 102(e) as being allegedly anticipated by Thurgate (US 6,255,165). This Section 102(e) rejection is respectfully traversed for at least the following reasons.

Claim 5 requires "a second insulating film comprising an oxide formed on the control gate, wherein: the side walls of the tunnel oxide film are at least partially receded from the side walls of the floating gate; and the second insulating film comprising an oxide covers and contacts each of the side walls of the tunnel oxide film, the side walls of the floating gate, the side walls of the first insulating film and the side walls of the control gate." Thus, claim 5 has been amended so as to require that the second insulating film (e.g., see 10 and/or 11 in Fig. 5) comprises an oxide and contacts the side walls of the tunnel oxide film (e.g., 2).

Thurgate fails to disclose or suggest this aspect of amended claim 5. Thurgate in Figs. 3E-3G discloses a memory device including tunnel oxide film 304, floating gate 308, ONO film 310, control gate 312, and alleged second insulating film 307. Thurgate teaches that the way to prevent edge lifting of the tunnel oxide is to provide a silicon nitride plug 305 at the sidewalls of the tunnel oxide 304 as shown in Figs. 3E-3G. Thus, Thurgate's entire invention is the use of nitride plugs 305 to prevent edge lifting of the tunnel oxide film 304.

In contrast with amended claim 5, Thurgate's alleged second insulating film 307 contacts nitride plugs 305, but does not contact tunnel oxide film 304. Moreover, one of ordinary skill in the art would never have removed silicon nitride plugs 305 from Thurgate because Thurgate expressly and repeatedly teaches that silicon nitride plugs 305 are necessary to prevent edge lifting which is the primary objective of Thurgate's purported invention. Accordingly, Thurgate teaches directly away from the invention of amended claim 5.

Claim 6 also requires that the second insulating film (e.g., see 10 and/or 11 in Fig. 5) comprises an oxide and contacts the side walls of the tunnel oxide film (e.g., 2). As explained above, Thurgate fails to disclose or suggest this aspect of claim 6.

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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